

IN THE CLAIMS

Page 13, line 1, change "Claims" to --What is claimed is:--.

Claims 1-13 (cancelled).

14. (New) A method for improving the depth discrimination of optical systems comprising the steps of:

- a) illuminating an object with a periodic structure;
 - b) registering the resulting brightness distribution;
 - c) creating displacement of the phase position of the periodic structure;
 - d) repeating steps a) to c) until at least three brightness distributions have been registered;
 - e) calculating the registered brightness distributions to obtain an object brightness distribution;
 - f) registering the displacements of the phase positions from c);
 - g) detecting brightness variations of the illumination;
 - h) determining bleaching phenomena of the object in fluorescence illumination;
- and
- i) carrying out calculation taking into account the results obtained in steps f) to h).

15. (New) The method for improving the depth discrimination of optical systems according to claim 14, wherein the bleaching phenomena of the object in fluorescence illumination are determined in that regions of identical illumination intensity are determined from preferably successively registered brightness distributions and these regions are compared to one another with respect to brightness.

16. (New) The method for improving the depth discrimination of optical systems according to claim 15, wherein a scaling factor is carried out by taking the quotients of the

registered brightnesses of the regions of identical illumination intensity and the registered brightness distributions are scaled using this scaling factor.

17. (New) The method for improving the depth discrimination of optical systems according to claim 14, wherein the determination of the object brightness distribution $m(x, y)$ is carried out by the equation

$$m(x, y) = \frac{\sqrt{a_1^2(x, y) + a_2^2(x, y)}}{a_0(x, y)},$$

wherein the vector

$$\vec{a} = \begin{pmatrix} a_0(x, y) \\ a_1(x, y) \\ a_2(x, y) \end{pmatrix}$$

is determined by solving a system of equations from the linking of the registered brightness distributions $I_i(x, y, \phi_i)$ to the registered phase displacements ϕ_i , where i represents the quantity of registrations of the brightness distribution.

18. (New) The method for improving the depth discrimination of optical systems according to claim 16, wherein the equation system links the scaled brightness distributions to the registered phase displacements.

19. (New) The method for improving the depth discrimination of optical systems according to claim 14, wherein a calibration of the displacements of the phase position is carried out, wherein a) an object, which is preferably a mirror surface, is illuminated by a periodic structure, b) a first brightness distribution is registered, c) the phase position of the periodic structure is changed by a small, definite amount which is registered, d) a second brightness distribution is registered, e) the difference between the two brightness distributions is determined and assessed with respect to stripe distribution, f) steps c) to e) are repeated until the valuing of the difference between the first brightness distribution and the subsequent

brightness distribution results in an extremum; and g) the value of the phase position of the periodic structure found in this way is registered.

20. (New) The method for improving the depth discrimination of optical systems according to claim 14, wherein errors resulting from non-sinusoidal distribution of the illumination of the object are corrected.

21. (New) The method for improving the depth discrimination of optical systems according to claim 20, wherein higher harmonics of the fundamental frequency of the periodic structure are filtered out of the brightness distribution by means of bandpass filters.

22. (New) The method for improving the depth discrimination of optical systems according to claim 14, wherein the registered brightness distributions are calculated by taking into account correction values, preferably for taking into account variations in brightness of the illumination, bleaching of the object in fluorescence illumination, and non-sinusoidal distribution of the illumination of the object, which are determined by linear optimization.

23. (New). The method for improving the depth discrimination of optical systems according to claim 22, wherein the linear optimization is applied to a merit function of the following form:

$$M(\theta_i; d; b) = \alpha_0 \left| F\{\bar{a}\}_0 \right|^2 + \alpha_i \left| F\{\bar{a}\}_\omega \right|^2 + \alpha_2 \left| F\{\bar{a}\}_{2\omega} \right|^2 + \dots + \alpha_n \left| F\{\bar{a}\}_{n\omega} \right|^2 \rightarrow \min ,$$

where $F\{a\}$ is a functional transform of vector a , θ_i are scalar factors for characterizing the variation in brightness of the illumination, d is a measurement for the bleaching of the object in fluorescence illumination, b is a factor for characterizing the non-sinusoidal distribution of the illumination of the object, and α_i are weighting coefficients for adapting to the recording conditions, preferably with respect to different signal-to-noise distances or preferred frequencies.

24. (New) The method for improving the depth discrimination of optical systems

according to claim 14, wherein bleaching phenomena of the object in fluorescence illumination are determined by determining a local correction function from preferably successive brightness registrations.

25. (New) The method for improving the depth discrimination of optical systems according to claim 24, wherein this correction function is determined by averaging over at least one period of the periodic illumination structure.

26. (New) The method for improving the depth discrimination of optical systems according to claim 24, wherein spiking of the calculated local correction function occurring in the neighborhood of edges of the bleaching function which are contained in the object is prevented by substituting an estimated value.